Pipelines 2013

Pipelines and Trenchless Construction and Renewals – A Global Perspective

Fort Worth, Texas, USA
23 – 26 June 2013

Volume 1 of 2

Editors:

Sam Arnaut
Larry Slavin

# Table of Contents

## Pipeline Infrastructure

**Protecting Drinking Water Systems from Low Pressure Transients—A Case Study**  
Don J. Wood, Gary Williams, Gewnn Phalempin, and Frank K. Smith III  

**China's Municipal Pipelines: Today and Tomorrow**  
Baosong Ma and Wei Zhou  

**Your First Instincts Are Usually Right: The Town of Gilbert Returns to CMAR to Construct a High-Profile Force Main/Gravity Sewer Project**  
Glen W. Roth and Mark Horn  

**Large-Diameter Transmission Pipeline Corrosion Control State-of-the-Art: Advances in the Steel Water Pipe Industry**  
Greg Smith and Richard Mielke  

**Development of a National Water Infrastructure Database: WATER/D and WATERiD+**  
Sunil K. Sinha and Walter Graf  

**Web-Based Performance Benchmarking Data Collection and Preliminary Analysis for Drinking Water Utility**  
Ankur Rathor and Sunil Sinha  

**The Right Technology for Asset Management Programs**  
Glenn H. Willson  

**Pipeline Infrastructure Coordination in Riyadh, Saudi Arabia**  
Robert Massarelli, C. Douglas Jenkins, and Ty Morton  

**Corrosion Protection Provided by Mortar Lining in Large Diameter Water Pipelines After Many Years of Service**  
Sylvia C. Hall  

**Comprehensive Sewer Condition Assessment Using CCTV and Electro Scan: International Cases**  
Andrew O'Keefe  

**Leon Creek Water Recycling Center Interconnect Pipeline—Bridging the Gap**  
Marisa Vergara, Josh Marazzini, Jeff Wouters, and Wesley Young  

**Emergency Lifeline Water Supply for San Angelo, Texas**  
Hutch Musallam, Greg Gould, Mike Fleury, Justin Sutherland, and Kevin Krueger  

**Performance Evaluation of Steel Fiber-Reinforced Concrete Pipe under D-Loads**  
Shawn R. Coombs, John Kurdziel, and Derek Secrist  

**Occasional and Recurring Surge Design Considerations for HDPE Pipe**  
Larry J. Petroff  

**Flowmeter Replacement Project at the Central Arizona Project (How Does One Measure 1,940 MGD?)**  

---

**Location**: ASCE Pipeline Infrastructure Conference  
**Date**: December 5-6, 2017, Nashville, Tennessee  
**Co-Chairs**: Christopher D. DeWitt, Chris A. Corcoran  
**Publication**: 2017 ASCE Pipeline Infrastructure Conference Proceedings  
**ISBN**: 978-0-7844-1156-0  
**DOI**: 10.1061/9780784411560-Chapter-002  

---

**Contributors**:  

---

**Contact**:  
American Society of Civil Engineers  
1801 Alexander Bell Drive  
Reston, VA 20191  
Tel: (800) 548-2723  
Fax: (703) 264-7999  
Email: info@asce.org  
Website: www.asce.org  

---

**Copyright**: Copyright © 2017, ASCE. All rights reserved. No part of this book may be reproduced in any form, in an electronic retrieval system or distributed for any purpose without the written consent of the publisher.
Jim Geisbush

Using a GIS Inventory to Guide the Storm Water Program in Fort Worth 181
    Douglas Smith and Elizabeth Young

Project Implementation and Construction Sequencing with 93 Projects: The Baton Rouge SSO Program 191
    Jennifer D. Baldwin, Amy E. Schulze, and Heather L. Smith

Field Implementation: A Valuable Point of View for Designers 201
    J. Zachary Huff and Ryan Opgenorth

Learning Where to Put Large Diameter Pipes in Urban and Political Jungles 211
    Anthony Parente, Rob Burchell, and R. Bradshaw

Tualatin Valley Water District’s Systematic Approach to Developing New Standards to Address Aging Pipeline Infrastructure 220
    Michael Britch

Emergency Repair of 36-inch Steel FM in Historic San Francisco Port Area 230
    Sylvia Hartanto and Rafael Ortega

Seismic Upgrades in the Watershed 238
    T. Richardson, M. Smith, L. Gullette, A. Mavroudis, and M. Monaghan

Tarrant Regional Water District Solves Joint Distress Issue in 72-inch PCCP using Carbon Fiber 248
    Tomas T. Jimenez, Michael Larsen, and David H. Marshall

Fitting Flow Control for Your Aqueduct 259
    Adam Murdock, Nathaniel Jones, and Daryl Devey

Houston Implements Carbon Fiber Upgrade for 60-inch PCCP under Rail Line 271
    Tomas T. Jimenez, Michael Larsen, and Gregory J. Henry

Control of Invasive Species in the IPL System 279
    Jerry W. Snead II and Shelly Hattan

Pipeline Planning and Design

The Maturation of LWC’s Small-Diameter Main Replacement Program by Embracing the Use of Net Present Value as a Selection Criterion 289
    Andrew F. Williams and Keith D. Coombs

Head Loss through Pipe Fittings for Laminar Flows 301
    Xiaodong Tian, Sean Xue-Yong Zhang, Matthew Valade, and Peter Young

Preparing Specifications for Conveyance Projects—Lessons Learned 309
    Roger Beieler

    Jeff Payne and Scott Taylor

Performance Evaluation of Resilience Metrics for Water Distribution Pipeline Networks 330
    Kalyan R. Piratla and Samuel T. Ariaratnam
Development History and Characteristics of the Bar-Wrapped Concrete Cylinder Pipe
Henry Bardakjian and Mike Murphy

Field Performance of 120-inch Pressure-Cast Steel Pipe Sections
Vic DeGrande, David Tantalean, and Michael Murphy

Experimental Evaluation of Soil-Pipe Friction Coefficients for Coated Steel Pipes
Shaurav Alam, Erez N. Allouche, Chris Bartlett, Ang Sherpa, and Brent Keil

Development of Analytical Model for Thrust Restraint Design—Part 1: Continuous Pipelines
ASCE Task Committee on Thrust Restraint Design of Buried Pipelines and Henry H. Bardakjian

Development of Analytical Model for Thrust Restraint Design—Part 2: Segmented Pipelines
ASCE Task Committee on Thrust Restraint Design of Buried Pipelines and Sri Rajah

Revision of the AWWA C200 Steel Water Pipe Manufacturing Standard: Consensus-Based Changes Mark Significant Improvements
John H. Bambei Jr. and Brent Keil

A Unique Engineering Geology Approach to Aid in Design and Construction of a Pipeline Project in Texas
Mark Wilkerson, John Larson, Matt Gaughan, and David Marshall

Solving Movable Ground Risks One at a Time in CUWCD Aqueduct Systems
Nathaniel Jones, Mark Breitenbach, and K. C. Shaw

Computational Fluid Dynamics Modeling of the Pueblo Dam River Outlet Works
Stephanie Harrison, Kevin Nielsen, Daniel Morse, and Jed Chambers

The Emergency $130-Million Ward County Water Supply Project
Russell Gibson, Nicholas Lester, John Grant, Mitch Holmes, and Jim Coley

Private Property Inflow Control Makes Hydraulic and Financial Sense: A Case Study in Cambridge, MA
David Bedoya, William C. Pisano, Connor J. Hill, Sandy-Kae Gray, and Owen O'Riordan

Response of Buried Pipes to Unsaturated Soil Conditions
Ramy Saadeldin, Yafei Hu, Sumi Siddiqua, and Amr Henni

The Development of Allowable Stresses for HDPE Piping
William I. Adams and John Fishburne

Challenges in Completing a Large Diameter Water Transmission Pipeline
Scott Maughn and Kara Byrnes

Addressing Geotechnical Challenges on Utah’s Provo Reservoir Canal Enclosure Project
Andrew Finney, Adam Murdock, Jeff Budge, and Shah Rahman

Large Diameter Water Main in a Congested Urban Environment Fort Worth East Side II 54-inch Water Main
Daniel Stoutenburg Jr., Robert McGee, and Susan L. Schwinger

Anchor Block Design Made Easy
Chris Sundberg
Towards A Pre-Cast Geopolymer Concrete Pipe
C. Montes, R. Islam, J. Shi, K. Kupwade-Patil, and E. N. Allouche

Fault Crossing Design of 66-Inch Pipeline—San Francisco Hetch Hetchy Water System
A. Nisar, A. Nervik, and A. Li

Caution! FEA in Use
George McAlpine

Effects of Application Methodology on Barrier Film Integrity and Performance of Polyurethane Coatings on Steel Water Pipe per AWWA C222
Julie Bell, David Marshall, Erika Perez, and Graham E. C. Bell

Fabrication of Large-Diameter, Thick-Walled Pipe to Meet Special Fault-Crossing Design Requirements for San Francisco Hetch Hetchy Water System
Vic DeGrande, Arne Nervik, Dan Fogg, and Raymond Mah

Pipeline Safety, Risk Management, and Condition Assessment

Leak Control in Wastewater Lateral Joint Using a Polymer Grout
C. Vipulanandan and S. Sunder

Condition Assessment of 7 Force Mains for Clark County Water Reclamation District
Jose L. Villalobos

Cooper Interceptor—54-inch Gravity Sewer Rehabilitation by Cured-in-Place Pipe (CIPP) Methodology for North Charleston Sewer District
James C. Reigart and Jarred R. Jones

Strategic Condition Assessment of the Water Distribution Network in Abu Dhabi
Guy Cleveland, Sandra Rolfe-Dickinson, Jonathan Rogan, and Punam Halal

Practice Review of the Cost of Condition Assessment and Renewal Engineering of Wastewater Pipelines as Part of the WATER/D Project
Stephen M. Welling and Sunil K. Sinha

Alteration of Soil Support to Cast Iron Pipelines due to Corrosion
T. M. Abed, D. N. Chapman, C. D. F. Rogers, and U. E. John

Case Study: Magnetic Flux Leakage Condition Assessment of a Mortar-Lined Steel Pipeline
Nathan D. Faber, John J. Galleher Jr., and Michael K. Kenny

Evaluation of 72-inch Steel Pipeline for Reverse Flow
Mike Conner, Doug Gillingham, and Andrew E. Romer

PCCP Rehabilitation Using Advanced Hybrid FRP Composite Liner
Tarek Alkhradaji, Silvia Rocca, and Nestore Galati

Assessing the Most Important Drains in the Known Universe: Experience at Major Beer Brewing Facilities
Mark Wade

The Effect of Negative Pressure on a Failed 54-inch PCCP with a Malfunctioning Valve in the Pipeline—A Case Study
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Rehabilitation of the Kenilworth PCCP Transmission Main</td>
<td>705</td>
</tr>
<tr>
<td>with Steel Slipliner</td>
<td></td>
</tr>
<tr>
<td>Jeff Peluso and Ron Brown</td>
<td></td>
</tr>
<tr>
<td>Pioneering Non-Destructive Condition Assessment Technologies for</td>
<td>716</td>
</tr>
<tr>
<td>Small-Diameter Cast and Ductile Iron Pipe</td>
<td></td>
</tr>
<tr>
<td>Sandra Rolfe-Dickinson, Adrian Davies-Jordan, and Guy Cleveland</td>
<td></td>
</tr>
<tr>
<td>Improving the Blast Performance of Water Pipeline Networks Using</td>
<td>726</td>
</tr>
<tr>
<td>Pneumatic Dampers</td>
<td></td>
</tr>
<tr>
<td>Hosseininejad, and Y. Rahnavard</td>
<td></td>
</tr>
<tr>
<td>Optimal Sensor Placement of TYTON Joints in the Water Pipeline</td>
<td>736</td>
</tr>
<tr>
<td>Networks Subjected to Near-Fault and Far-Fault Earthquakes</td>
<td></td>
</tr>
<tr>
<td>Hosseininejad, and Y. Rahnavard</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation of 120-inch PCCP at a New Mexico Power Plant Using</td>
<td>747</td>
</tr>
<tr>
<td>CFRP and Strongpipe Hybrid FRP Systems</td>
<td></td>
</tr>
<tr>
<td>Silvia Rocca, Tarek Alkhrdaji, and Matthew Frye</td>
<td></td>
</tr>
<tr>
<td>Study on the Flow Model of Annulus Drilling Fluid in the Large</td>
<td>757</td>
</tr>
<tr>
<td>Diameter Horizontal Directional Drilling</td>
<td></td>
</tr>
<tr>
<td>Xuefeng Yan, Cong Zeng, Yaozu Kong, and Chao Yang</td>
<td></td>
</tr>
<tr>
<td>Effects of the Location of Broken Prestressing Wire Wraps in</td>
<td>767</td>
</tr>
<tr>
<td>Structural Integrity of a Damaged PCCP</td>
<td></td>
</tr>
<tr>
<td>Ali Alavinasab, Edward Padewski III, and Mike Higgins</td>
<td></td>
</tr>
<tr>
<td>Pipeline Asset Management Using a GIS Solution</td>
<td>775</td>
</tr>
<tr>
<td>Peter D. Nardini, Mehdi S. Zarghamee, Courtney Jalbert, and Mike</td>
<td></td>
</tr>
<tr>
<td>Garaci</td>
<td></td>
</tr>
<tr>
<td>Prestressed Concrete Cylinder Pipe Management: Communication</td>
<td>787</td>
</tr>
<tr>
<td>Methodologies and Decision Support Tools for the San Diego County</td>
<td></td>
</tr>
<tr>
<td>Water Authority—A Case Study</td>
<td></td>
</tr>
<tr>
<td>Martin R. Coghill</td>
<td></td>
</tr>
<tr>
<td>BEM and WIP Technology for Condition Assessment of Pipelines and</td>
<td>800</td>
</tr>
<tr>
<td>Other Engineering Assets</td>
<td></td>
</tr>
<tr>
<td>Martin Roubal</td>
<td></td>
</tr>
<tr>
<td>Development of a BTEX Permeation Calculator for High Density</td>
<td>814</td>
</tr>
<tr>
<td>Polyethylene (HDPE) Water Pipe</td>
<td></td>
</tr>
<tr>
<td>Dae-Hyun (Dan) Koo</td>
<td></td>
</tr>
</tbody>
</table>